VIRGINIA TOXICS RELEASE INVENTORY (TRI) REPORT

March 2005

TRI

Summary of Data from 2003 Facility Reports

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

THE VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY AND ITS PROGRAMS

It is the policy of the Virginia Department of Environmental Quality to protect the environment of Virginia in order to promote the health and well-being of the Commonwealth's citizens. To this end, the Department implements numerous programs, as described at http://www.deq.virginia.gov/programs/homepage.html. These include media programs (such as Air Quality, Water Quality, Water Resource Management, and Waste Management), area programs (such as the Chesapeake Bay Program and the Virginia Coastal Program), special programs (such as Small Business Assistance and Citizen Monitoring), and many others. The Department is committed to pollution prevention and elimination or reduction of waste at the source of generation, through efforts like the Virginia Environmental Excellence Program, Businesses for the Bay, and the Virginia Regional Environmental Management System.

The Department is also committed to integrating the knowledge and opinions of others into its decisions. The publication of this *Virginia Toxics Release Inventory Report*, under Va. Code § 10.1-1186.1, is one way the Department disseminates information on toxic chemicals to Virginia's citizens, industry, and government. All parts of this agency and other sectors of government, all Virginia businesses and industry, and all Virginia's citizens have a role in managing and controlling the release of toxic chemicals in the Commonwealth.

TABLE OF CONTENTS - VIRGINIA TRI REPORT

Summary of Data from 2003 Facility Reports (issued March 2005)

Executive Summary
Virginia Toxics Release Inventory (TRI) Report -
Summary of Data from 2003 Facility Reports
(March 2005)

In March of each year, the Virginia Department of Environmental Quality (the Department) publishes the Virginia Toxics Release Inventory (TRI) Report, in accordance with Virginia Code § 10.1-1186.1. The Virginia TRI Report contains information on the release, transfer, or other management of listed chemicals and chemical categories, as reported by Virginia industries in specified industrial sectors and by federal facilities located within the Commonwealth. The facilities' reports are required under federal law, known as the Emergency Planning and Community Right-to-Know Act (EPCRA), or SARA Title III. The Virginia TRI Report is a multi-media report covering air, water, and waste management activities, and it addresses a variety of handling practices, including releases, recycling, energy recovery, and on-site and off-site treatment and disposal.

This year's Virginia TRI report covers calendar year, or "reporting year," 2003, the most recent year for which data is available, and includes all reports and revisions received by the Department on or before December 15, 2004. For calendar year 2003, 501 Virginia facilities filed 1919 individual reports on the release, transfer, or management of TRI chemicals or chemical categories. This was a decrease from the 504 facilities (<1%) and 2010 reports (4.5%) filed for calendar year 2002. For 2003, Virginia facilities reported the release, transfer, or management of 160 chemicals and chemical categories, out of the more than 650 chemicals and chemical categories that are subject to the TRI. For 2002, 157 chemicals and chemical compounds had been reported.

Virginia facilities reported the release, transfer, or on-site management of almost 379 million pounds of TRI chemicals during calendar year 2003 (a 6.5% decrease from 2002). Of this total:

- *64.8 million pounds of TRI chemicals were released on-site at reporting Virginia facilities (an 8.9% decrease from 2002);*
- *64.9 million pounds of TRI chemicals were transferred off-site from reporting Virginia facilities for treatment, recycling, energy recovery, or disposal (a 3.6% decrease from 2002); and*
- *249 million pounds of TRI chemicals were managed on-site by treatment, recycling, or energy recovery (a 6.6% decrease from 2002).*

The Virginia TRI Report addresses separately those TRI chemicals that the U.S. Environmental Protection Agency (EPA) has designated as persistent bioaccumulative toxins (PBTs). These chemicals remain in the environment for long periods of time, are not readily destroyed, and build up or accumulate in body tissue. According to the reports, Virginia facilities reported the release, transfer, or on-site management of almost 1.8 million pounds of TRI chemicals during calendar year 2003 (a decrease of 11.8% from 2002). Of this total:

- *387,763 pounds of PBT chemicals were released on-site at reporting Virginia facilities (a 6.3% increase from 2002);*

- *1.3 million pounds of PBT chemicals were transferred off-site from reporting Virginia facilities for treatment, recycling, energy recovery, or disposal (a 16.8% decrease from 2002); and*

- *An additional 35,154 pounds of PBT chemicals were managed on-site by treatment, recycling, or energy recovery (a 57% increase from 2002).*

Dioxins and dioxin-like compounds account for just over 195 grams (approximately 0.43 pounds) of the PBT chemicals released, transferred, or managed by Virginia facilities during calendar year 2003.

As required by statute, the Virginia TRI Report also addresses industrial sectors (identified by standard industrial code), facilities, and facility location (jurisdiction). For calendar year 2003, three reporting industrial sectors account for 67% of the total on-site releases to the environment. These were: electric, gas, and sanitary services; paper and allied products; and chemicals and allied products. For calendar year 2003, three sectors contributed 57.5% of the total on-site management of TRI chemicals. These were: paper and allied products; national security and international affairs; and chemicals and allied products. The text of the report details further information about the industrial sectors, facilities, and jurisdictions with the largest reported on-site releases and other on-site management of TRI chemicals.

The Virginia TRI Report provides the public with information concerning specified toxic chemicals and chemical compounds that are manufactured, processed, or otherwise used at categories of Virginia facilities. This information can help both the public and industry identify potential concerns and develop effective strategies for reducing toxic chemical usage and release. However, the data in the Virginia TRI Report does not represent a measure of the public's exposure to chemicals, nor does it assess risk. Many of the releases are regulated and permitted under other state and federal programs that are designed to protect human health and the environment. Because of differences in reporting schedules and receipt of reports, the information in the Virginia TRI Report will not completely match the information in the national Toxics Release Inventory - Public Data Release, as published by EPA.

It is the policy of the Virginia Department of Environmental Quality to protect the environment of Virginia in order to promote the health and well-being of the Commonwealth's citizens. The Department implements numerous programs, as described at http://www.deq.virginia.gov/programs/homepage.html. The Department is committed to pollution prevention and elimination or reduction of waste at the source of generation. The Department is also committed to integrating the knowledge and opinions of others into its decisions. The publication of this Virginia Toxics Release Inventory Report, under Va. Code § 10.1-1186.1, is one way the Department disseminates information on toxic chemicals to Virginia's citizens, industry, and government. All parts of this agency and other sectors of government, all Virginia businesses and industry, and all Virginia's citizens have a role in managing and controlling the release of toxic chemicals in the Commonwealth.

Introduction

Part One - Virginia TRI Reporting

Statutory and Regulatory Basis

The Virginia Toxics Release Inventory (TRI) Report is published annually pursuant to Virginia Code § 10.1-1186.1 (see Appendix A). It contains information about the release, transfer, or other management of listed chemicals and chemical categories, as reported by over 500 Virginia industries and federal facilities. The facilities are required to submit their reports pursuant to the federal Emergency Planning and Community Right to Know Act (EPCRA), also known as SARA Title III.[1] The Code directs the Virginia Department of Environmental Quality (the Department) to publish the Virginia TRI Report in March of each year and to include information for the most recent calendar year for which data are available (for this report, calendar year 2003). The Code also directs that the report be organized by chemical, facility, facility location, and standard industrial classification (SIC) code. Federal law requires facilities to submit their TRI reports both to the U.S. Environmental Protection Agency (EPA) and to the Commonwealth.[2] This Virginia TRI Report is compiled directly from the reports received from Virginia facilities. This report and its attachments are distributed and available to the public over the Internet (http://www.deq.virginia.gov/sara3/313.html) and in written form. A Glossary of Terms is included as Appendix B.

Current Year (2003) Virginia Facility Reports

Under the federal requirements, facilities are required to submit their reports for a calendar year (or "reporting year") by the following July 1st. Facility reports on calendar year 2003 activities were due on or before July 1, 2004, and they provide the most recent information available for this March 2005 TRI report.

This year's Virginia TRI Report includes all facility reports and revisions received by the Department on or before December 15, 2004. For reporting year 2003, 501 Virginia facilities filed 1919 individual reports on the release, transfer, or other management of TRI chemicals or chemical categories. This was a decrease from the 504 facilities (<1%) and 2010 reports (4.5%) filed for calendar year 2002. For 2003, Virginia facilities reported the release, transfer, or other management of 160 of the more than 650 chemicals and chemical categories that are subject to the TRI. For 2002, 157 chemicals and chemical compounds had been reported.

Notes on This Year's TRI Report and On-Line Data Submission

This year's TRI report contains additional detail on facilities' on-site releases to land, and additional historical comparisons on persistent, bioaccumulative toxic (PBT) chemicals. Like last year's report,

[1] 42 U.S.C. § 11023, or SARA § 313.
[2] 42 U.S.C. § 11023(a).

this report continues to provide separate information and rankings by industry sector and jurisdiction. It has been suggested that the Virginia TRI data be made accessible through a geographic information system (GIS). Although no separate GIS system is available for his report, EPA has provided on-line tools to search its TRI information by ZIP code and location (see http://www.epa.gov/tri/).[3] Readers are encouraged to utilize the resources listed in this report and its appendices, along with other data, to assist with their understanding of the overall use, release, management, and health hazard of TRI chemicals.

The Department continues to make improvements to the Virginia TRI. In 2005, Virginia anticipates becoming one of four states to pilot the on-line submission of reporting year 2004 TRI data to EPA and the Commonwealth simultaneously (i.e., for next year's report). This system will reduce manual data entry and the burden of duplicate reporting. It should also help minimize the differences between the EPA and Virginia data.

Part Two - National Toxics Release Inventory Reporting Program

The National Toxics Release Inventory

The Virginia TRI Report is compiled directly from reports that Virginia facilities submit under federal law and regulations.[4] Using those same authorities, EPA compiles and maintains nation-wide information in its annual *Toxics Release Inventory - Public Data Release*, which is available to the public over the Internet (http://www.epa.gov/tri/) and in written form. The national Toxics Release Inventory was established to provide information to the public about the presence and release of toxic and hazardous chemicals in their communities. From its inception, the national TRI program (and consequently the Virginia TRI program) has been expanding and evolving to meet the needs of an informed public. This report contains only a summary of the national TRI program. A list of supplementary resources on the program can be found in found in Appendix C, and more detailed information about the historical changes can be found in Chapter Four and in Appendix D.

Facilities That Must Report

Under the national TRI program, a facility must submit a TRI report (or reports) to EPA and the state if:

1) **It has ten or more full-time employees** (a combined total for all employees of 20,000 hours or more for the year);

2) **The facility's primary business is within one of 29 specified Standard Industrial Classification (SIC) codes.**[5] The list of covered industry groups is set out in Appendix E; and

[3] The date of EPA's publication of 2003 data may be different from the Department's.
[4] The national TRI was established under Title III, Section 313, of the Federal Superfund Amendments and Reauthorization Act (SARA), which is also known as the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), 42 U.S.C § 11023. The related federal regulations are found at 40 CFR Part 372.
[5] The Department is aware that EPA has proposed to substitute the North American Industry Classification System (NAICS) for Standard Industrial Classification (SIC) codes (see 68 Fed. Reg. 13872 (March 21, 2003)). This change is not yet final.

3) **The facility manufactured, processed, or otherwise used a reportable toxic chemical in quantities greater than the established threshold in the course of a calendar year.** The definitions of "manufactured," "processed," and "otherwise used" can be found in Appendix B.[6]

Federal facilities are also required to comply with EPCRA and the Pollution Prevention Act (PPA) of 1990, in accordance with Executive Order 13148. That Executive Order requires all federal facilities that manufacture, process, or otherwise use any listed EPCRA Section 313 chemical above the reporting threshold to submit a TRI report.

Chemicals and Chemical Categories

For a chemical or chemical category to remain on or be added to the TRI list, it must be known to cause or reasonably be anticipated to cause one of the following:

- adverse acute health effects at significant concentration levels beyond facility boundaries as a result of continuous or frequently occurring releases;
- cancer in humans; or
- a significant adverse effect on the environment because of its toxicity and persistence in the environment.

As new chemicals of concern are identified, they are added to the TRI list, and if TRI chemicals are found not to meet the toxicity requirements, they can be deleted. Currently, the reportable TRI chemical list contains over 650 chemicals and chemical categories. A complete list of TRI chemicals and chemical categories for calendar year 2003 reports can be found in the EPA publication "The Emergency Planning and Community Right-to-Know Act - Section 313 Release and other Waste Management Reporting Requirements" (EPA260/K-01-001, February, 2001). The publication can be found online at: http://www.epa.gov/tri/guide_docs/2001/brochure2000.pdf. As noted, for 2003, Virginia facilities reported the release, transfer, or other management of 160 chemicals and chemical categories that are subject to the TRI.

Reporting Forms and Activities That Must Be Reported

Each year, reporting facilities submit one reporting form for each TRI chemical or chemical category that is manufactured, processed, or otherwise used in amounts equal to or greater than the threshold values. For each TRI chemical or chemical category, facilities must submit either a Form A (a simplified form) or a Form R (a longer form). Form A has significant restrictions governing its use.[7] Blank reporting forms are found in Appendices F1 and F2.

---

[6] The annual thresholds for non-PBT chemicals are 25,000 pounds for manufacturing, 25,000 pounds for processing, and 10,000 pounds for "otherwise use" of a TRI chemical. For PBT chemicals, the thresholds are lower. For example, dioxin and dioxin-like compounds have a threshold of 0.1 gram, and lead and lead compounds have a threshold of 100 pounds. For PBT chemicals, these lower reporting thresholds apply whether the chemical is manufactured, processed, or otherwise used.

[7] A facility can use Form A only if the total annual reportable amounts for an individual chemical or category do not exceed 500 pounds, and if the facility's total manufactured, processed, and/or otherwise used amounts do not exceed one million pounds. PBTs cannot be reported using Form A.

Data used to prepare quantitative information in the Virginia TRI Report come principally from Part II of the Form R reports, and specifically from Sections 5, 6, 7, and 8 of Part II, Form R. These sections are referred to throughout the Virginia TRI Report and are described below:

- **Section 5: Quantity of toxic chemical entering/releasing to each environmental medium on-site.** Release reporting is broken down into categories: releases to the air (from stack and fugitive emissions), releases to water (total and percent of total from stormwater), and releases to land (underground injection, disposal to land, RCRA (Resource Conservation and Recovery Act) Subtitle C landfills, other landfills, land treatment/application farming, surface impoundment, or other disposal).

- **Section 6**: **Transfers of the toxic chemical in wastes to off-site locations.** Section 6 contains two main subsections: transfers to publicly owned treatment works (POTWs); and transfers to all other off-site locations (in-state or out-of state). Facilities are required to provide the name and location of off-site locations, the quantity transferred, and the method of management (treated, disposed, recycled, or burned for energy recovery).

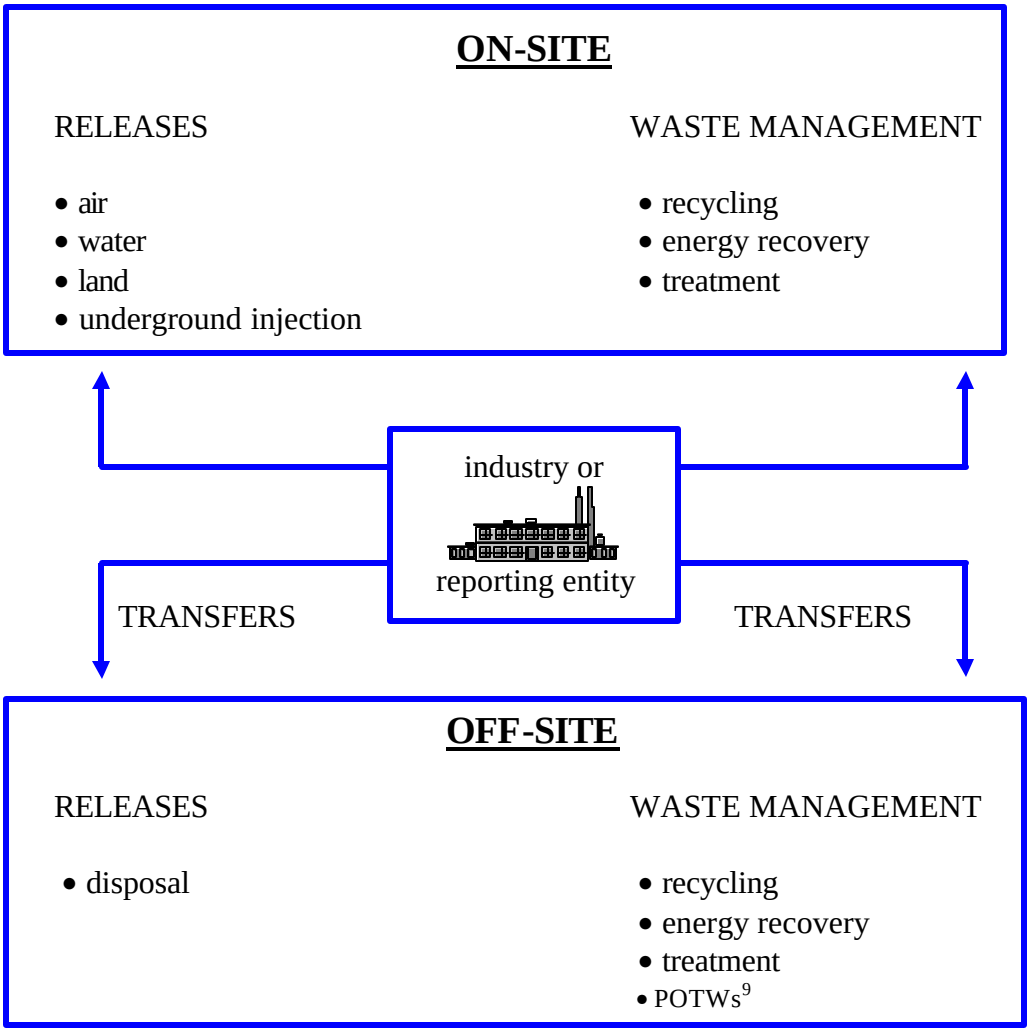
- **Section 7**: **On-site waste treatment methods and efficiency (including energy recovery processes and recycling processes).** Facilities are asked to provide mostly qualitative information on the on-site treatment processes, the estimated range of influent concentration, and the efficiency of the operation.

- **Section 8**: **Source reduction and recycling activities.** Section 8 was added to the Form R report as a result of the federal Pollution Prevention Act in 1990 to track production-related activities. Section 8 extracts and re-aggregates data reported in Sections 5 through 7 into environmental releases (production-related on-site and off-site releases), off-site transfers/management, and on-site management. While Section 7 contains qualitative information about on-site management practices, Section 8 asks for related quantitative data.[8]

The flow chart (Figure 1) illustrates the information collected on Form R for TRI chemicals:

[8] Section 8 and its subsections also request previous-year reporting and future year estimates for production-related releases, transfers for off-site management, and on-site management. Other subsections of Section 8 ask for episodic/catastrophic releases (non-production related), qualitative information on source reduction activities, and a production ratio or activity index to better engage the facility's efforts in source reduction.

Figure 1 - Schematic Diagram of the TRI Data Collection Coverage



Part Three - Uses and Limitations of TRI Data

The Virginia TRI Report provides the public with information concerning designated toxic chemicals and chemical categories manufactured, processed, or otherwise used at facilities in the Commonwealth, including the amounts released to the environment or managed as wastes. This information can enable the public to identify potential concerns, and to work with industry and government to reduce toxic chemical releases and the risks associated with them.

Industry can use the data to obtain an overview of use and release of toxic chemicals, to identify and reduce costs associated with toxic waste, to identify promising areas for pollution prevention, to establish reduction targets, and to measure and document progress toward reduction goals.

[9] Publicly Owned Treatment Works

The public availability of the data has assisted many facilities in working with their communities to develop effective strategies for reducing environmental and human health risks that may result from toxic chemical releases. Since the TRI Program's inception in 1988, there has been a historic downward trend in the amount of TRI chemicals released to the environment and managed as wastes. That trend continued for calendar year 2003; Virginia facilities reported a 6.5% decrease in the release, transfer, or on-site management of TRI chemicals for the year (see Table 6, Chapter Four). Nevertheless, there are limitations on the use of TRI data:[10]

1. The TRI report contains reported information on the quantities of chemicals released, transferred, and managed, not the public's exposure to or risk from the chemicals. Risk to human health by a chemical release depends on the toxicity of the chemical, how it disperses, reacts, or persists in the environment, and includes the quantity, concentration, and type of human exposure. Furthermore, the chemicals reported for the TRI report do not have equal toxicity. Due to the limited nature of TRI data collected, readers are discouraged from making any health or environmental risk/exposure assessments based simply on the information presented.[11] Many of the TRI chemical releases are permitted under other federal and state regulatory programs; therefore, data from these regulatory programs should provide additional information to better inform the citizens.
2. The TRI program captures only a portion of all toxic chemical management in Virginia. It does not account for TRI chemicals from most non-manufacturing facilities, facilities with fewer than ten employees, facilities that do not meet the chemical quantity thresholds, other non-industrial sources, or transportation-related emissions.
3. The majority of facilities report TRI data based on estimates, since the TRI program does not require that they monitor releases, only that they use best available data. Using different methods to estimate data can result in significant variability from one facility to another, as well as year to year.
4. Patterns of releases and other waste management activities can change significantly. Thus, the data in this report for a specific facility may be markedly different from those reported for 2002.
5. Direct comparison between figures in this report and figures in past Virginia Toxics Release Inventory (TRI) Summary Reports is discouraged because of changes in reporting requirements and because facilities may revise reports from previous years. Several historical comparisons, with appropriate standardization of data, have been made in Chapter 4 and Appendix G of this report.
6. EPA is required by law to compile an annual *Toxics Release Inventory - Public Data Release* nationally. It is known and anticipated that the data published in the Virginia TRI Report will not completely correspond to the data published by the EPA. Contributing factors include: differing dates on which data are extracted for processing, revised facility reports, and facilities that report to the Commonwealth or EPA but not both. The Department and EPA continue to work together to rectify such differences, such as by piloting the simultaneous, online submission of facility reports.

[10] See the EPA pamphlet on using TRI data at http://www.epa.gov/tri/2002_tri_brochure.pdf.
[11] EPA publishes a screening tool, called RSEI, on its website, but it is not a detailed or quantitative risk assessment. See http://www.epa.gov/opptintr/rsei/

Chapter One - 2003 Virginia TRI Data Review

Chapter 1 describes the 2003 reporting year data in its entirety, based on the type of activity and the chemicals and chemical categories reported. The chapter is divided into four parts:

- Part One presents an **overview and summary** of 2003 data collected.
- Part Two discusses **on-site releases** of TRI chemicals, whether to air, water, or land.
- Part Three of the chapter discusses the **off-site transfers** of TRI chemicals, whether to publicly owned treatment works (POTWs) or to other off-site locations.
- Part Four of the chapter discusses a variety of **on-site and off-site management activities,** as part of a focus on source reduction and recycling.

While this chapter includes all TRI chemicals, Chapter 2 addresses persistent bioaccumulative toxic (PBT) chemicals in more detail. Appendices H and I contain facility-specific information, arranged by jurisdiction, for TRI chemicals (excluding PBTs) and for PBT chemicals, respectively.

Part One - 2003 Overview and Summary

For calendar year 2003, Virginia facilities reported that they released, transferred, or managed almost 379 million pounds of TRI chemicals (see Table 1).[12]

Approximately 64.8 million pounds of TRI chemicals were reported to have been released on-site to the environment. Air releases represented approximately 51 million pounds, or 78.6% of all the TRI chemicals released on-site in 2003. Releases to the water totaled approximately 8.2 million pounds, or 12.7% of the total released on-site. Releases to the land totaled approximately 5.7 million pounds, or 8.7% of the total released on-site. For 2003, the amount of TRI chemical releases to the environment represented approximately 17.1% of the total for TRI chemicals released, transferred or managed.

Off-site transfers totaled approximately 64.9 million pounds of TRI chemicals. Off-site transfers to Publicly Owned Treatment Works (POTWs) totaled approximately 18.8 million pounds. Off-site transfers to other (non-POTW) facilities (for treatment, recycling, energy recovery and disposal) totaled approximately 46.1 million pounds.

Facilities reported that approximately 249 million pounds of TRI chemicals were managed on-site by treatment, recycling, or energy recovery.

[12] As described in the Introduction, data from Sections 5 and 6 of the federal Form R is carried forward into Section 8 of the form. Consistent with past reports, Part One of this chapter discusses data from Section 5 (Releases), from Section 6 (Off-Site Transfers), and from those subsections of Section 8 that are independent of Sections 5 and 6 (On-Site Energy Recovery, Recycling and Treatment (i.e., subsections 8.2, 8.4, and 8.6)). Also consistent with past reports, Part Four of this Chapter describes data from all of Part 8 of the Form R independently. In this way duplicate counting of data is avoided. Because of differences in reporting requirements, described in the text, the totals in Part One and Part Four do not precisely match.

Table 1. Summary of Data by Type of Release, Transfer, and On-Site Management for TRI Chemicals (in pounds per year)

ON-SITE RELEASES BY MEDIA (Section 5 of Form R)		
Total Air		50,962,772
Fugitive Air	5,239,126	
Stack Air	45,723,646	
Water		8,199,535
Total Land		5,651,581
Landfills	3,316,947	
Land Treatment / Application	203,048	
Surface Impoundment	1,887,312	
Other Disposal	244,274	
Underground Injection	0	
Total On-Site Releases to Media		**64,813,888**

OFF-SITE TRANSFERS BY TYPE (Section 6 of Form R)		
Publicly Owned Treatment Works (POTWs) (includes metals and metal compounds)		18,771,839
Total Other Off-Site Transfers		46,114,495
Off-Site Transfers for Recycling	22,063,770	
Off-Site Transfers for Energy Recovery	11,792,758	
Off-Site Transfers for Other Treatment	2,723,642	
Off-Site Transfers for Disposal	9,534,325	
Total Off-Site Transfers		**64,886,334**

ON-SITE MANAGEMENT (Subsections 8.2, 8.4, and 8.6 of Form R) *		
Treated On-Site	125,280,332	
Recycled On-Site	105,170,428	
Energy Recovery On-Site	18,410,731	
Total On-Site Management		**248,861,491**

Total TRI Chemicals Released On-Site, Transferred Off-Site, or Managed On-Site by Reporting Facilities		**378,561,713**

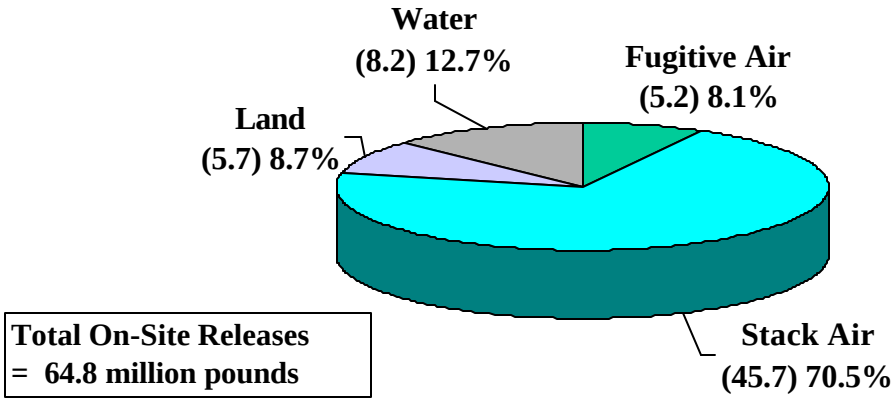
* See previous footnote.

Part Two - On-Site Releases to the Environment

Part Two of this Chapter discusses the on-site releases of TRI chemicals to the environment by facilities, as reported in Section 5 of the Form R. The quantities include production-related releases and any catastrophic releases or one-time events not associated with routine production processes.

A release refers to an on-site discharge of TRI chemicals to the air, water, or land, and to disposal in underground injection wells. Any reductions in waste achieved by on-site treatment methods are taken into account when facilities determine their release data. Approximately 64.8 million pounds of TRI chemicals were reported as released into the environment by reporting facilities for calendar year 2003.

Figure 2. On-Site Releases of TRI Chemicals to All Media for Reporting Year 2003 (from Section 5 of Form R. The number inside the parentheses is the quantity of releases in each category in millions of pounds, and the percent figure is the percent of total on-site releases.) There were no underground injection releases reported in 2003.



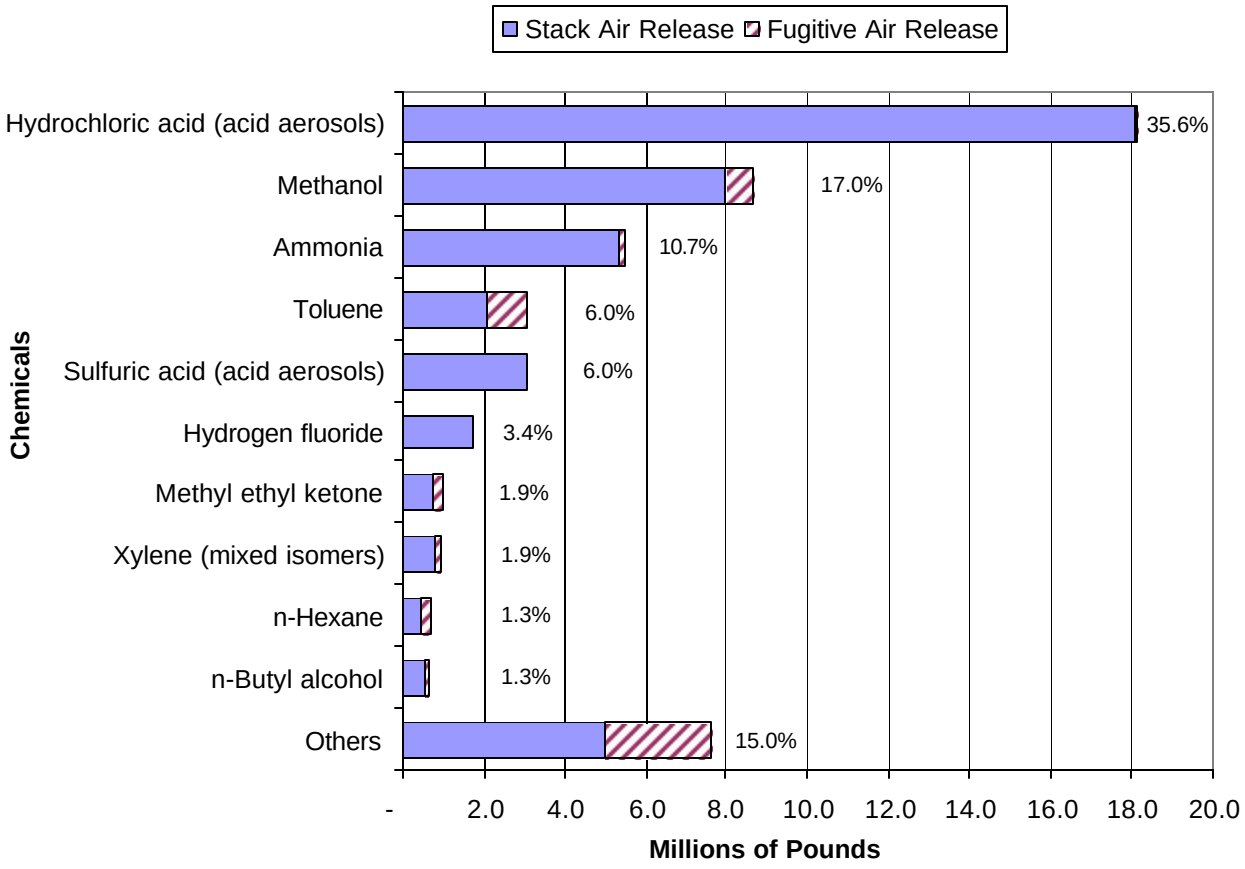
On-Site Releases to the Air

On-site air releases are classified as either "fugitive" (non-point source) or "stack" (point source) air emissions. Examples of fugitive air emissions are equipment leaks from valves, pump seals, flanges, compressors, sampling connections, open-ended lines, and evaporative losses from surface impoundments and spills. Stack air emissions are releases to the air that are conveyed through stacks, ducts, pipes, vents, or other confined air streams. Most, if not all, facilities reporting to TRI have permitted stack air emissions.

Based on the amount of fugitive and stack air emissions reported, total air releases of all TRI chemicals was 51.0 million pounds, which accounted for 78.6% of the total on-site releases to media (air, water, and land). The top ten TRI chemicals released to the air made up approximately 85% of the total reported TRI air emissions in 2003 (See Figure 3). The top ten TRI chemicals released to the air in Virginia were: hydrochloric acid, methanol, ammonia, toluene, sulfuric acid, hydrogen fluoride, methyl ethyl ketone, xylene (mixed isomers), n-hexane, and n-butyl alcohol. Acid aerosols such as hydrochloric acid, sulfuric acid, and hydrogen fluoride were mainly generated during the combustion of

coal or oil. Electric power generating facilities, in particular, contributed to the emissions of acid aerosols. Methanol, ammonia, and toluene continued to be the significant air pollutants generated from the manufacturing sector.

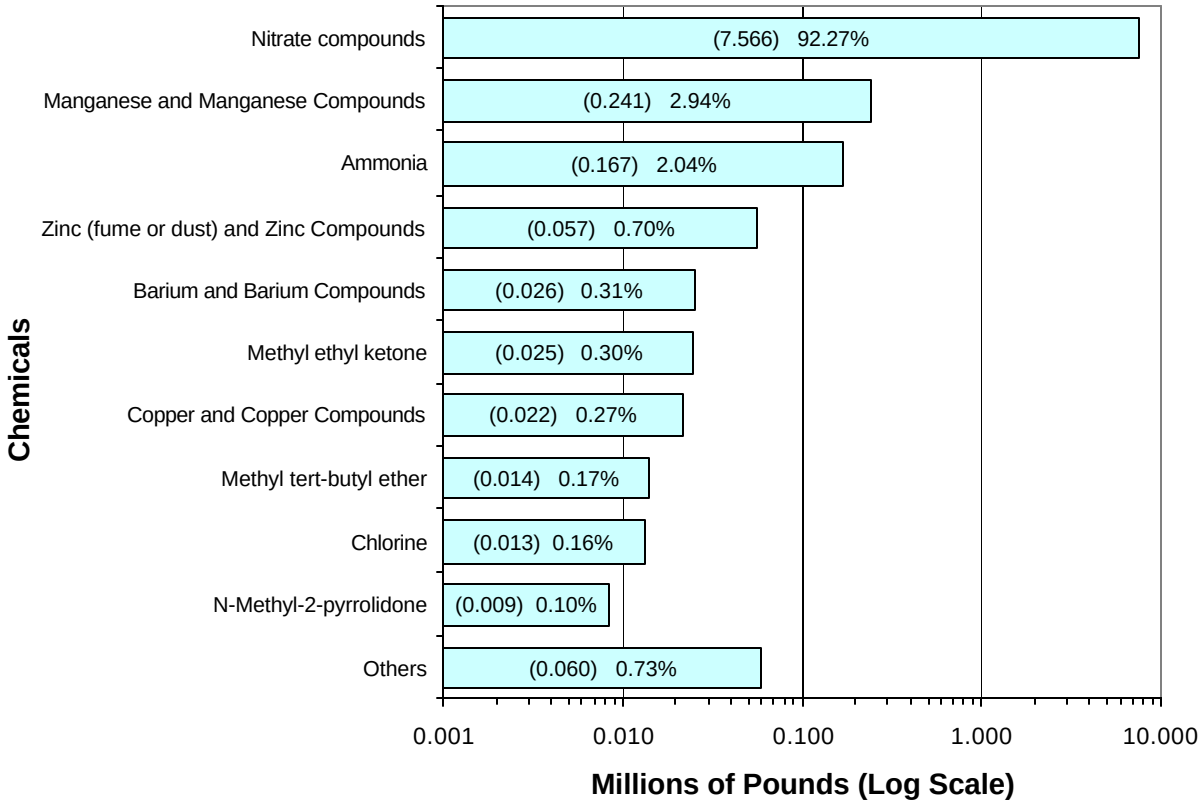
Figure 3. Top Ten TRI Chemicals Released to the Air On-Site in 2003 (from Section 5 of Form R. The number next to each bar is the % of total air releases for all 2003 chemicals reported.)



On-Site Releases to Water

On-site releases to water include discharges to surface waters, such as rivers, lakes, ponds, and streams. Reported on-site releases of TRI chemicals to water in 2003 totaled almost 8.2 million pounds and accounted for 12.7% of all on-site releases to the air, water, and land in 2003. Ten chemicals and chemical categories accounted for more than 99% of the on-site TRI chemical releases to the water. The top ten TRI chemicals released to water were: nitrate compounds (92.3% of total releases to water), manganese and manganese compounds, ammonia, zinc and zinc compounds, barium and barium compounds, methyl ethyl ketone, copper and copper compounds, methyl tert-butyl ether, chlorine, and n-methyl-2-pyrrolidone. Nitrate compounds are a common byproduct of industrial wastewater treatment processes and have consistently been reported as the major chemical released to the surface water. Nitrates can pose a nutrient problem to water bodies.

Figure 4. Top Ten TRI Chemicals Released to Water On-Site in 2003 (from Section 5 of Form R.) The information presented here is in logarithmic, base 10 scale, which compresses the bar chart to show up to many magnitudes of difference between nitrate compounds and n-methyl-2-pyrrolidone. Please note the scale mark of 1.000 means 1 million pounds, the scale mark of 0.100 means 0.1 million pounds, etc. The number in the parentheses represents the quantity in millions of pound followed by percent of total reported releases to water.

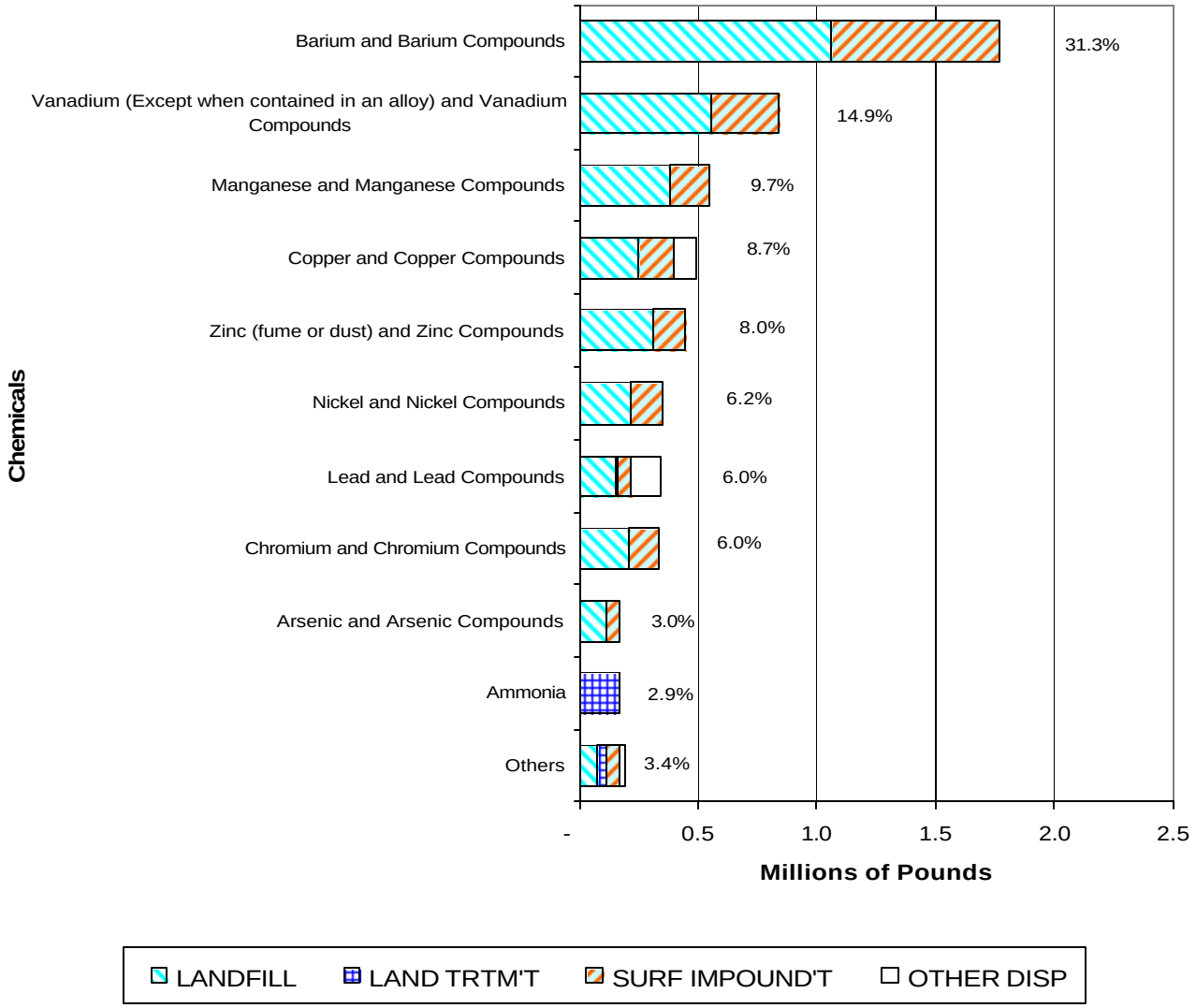


On-Site Releases to the Land

On-site releases to the land refer to landfilling, land treatment/application farming, surface impoundment, or any other release of a TRI chemical to land within the boundaries of a facility. No underground injection of TRI chemicals was reported in 2003.

The total amount of TRI chemicals released to the land in Virginia during 2003 was 5.7 million pounds. That accounted for 8.7% of all reported on-site TRI releases (releases to the air, water, and land). The top ten TRI chemicals constituted approximately 96.6% of all the TRI chemicals released to the land. They were: barium and barium compounds, vanadium and vanadium compounds, manganese and manganese compounds, copper and copper compounds, zinc and zinc compounds, nickel and nickel compounds, lead and lead compounds, chromium and chromium compounds, arsenic and arsenic compounds, and ammonia (Figure 5). Metals and metal compounds such as barium are found naturally in coal combusted for energy generation and in the ashes remaining after combustion of the coal. Ammonia is the only chemical in the top ten list that is not a metal.

Figure 5. Top Ten TRI Chemicals Released On-Site to the Land in 2003 (from Section 5 of Form R. The number next to each bar is the % of total on-site land releases for all 2003 chemicals reported.)



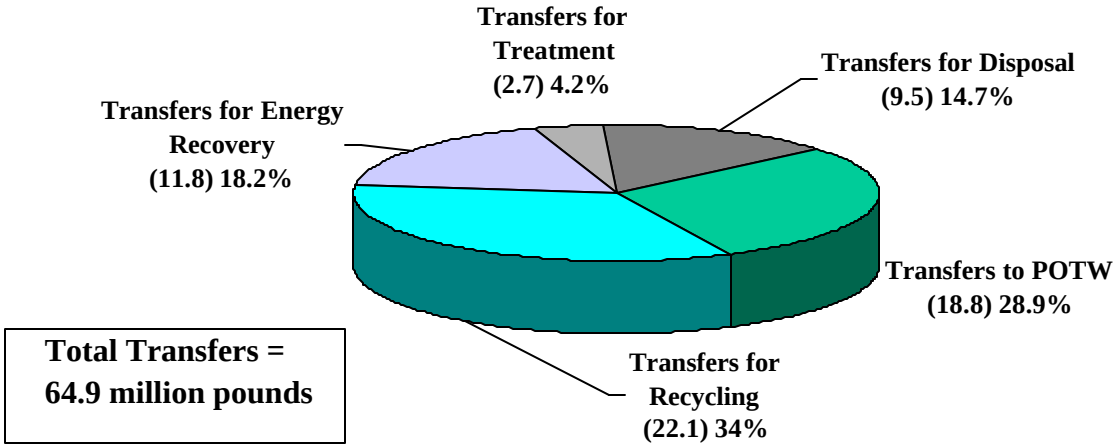
Part Three - Off-Site Transfers

Transfers refer to TRI chemicals sent off-site. Transfers are reported as transfers to Publicly Owned Treatment Works (POTWs) or other off-site destinations, such as incinerators, landfills, or other facilities for recycling, energy recovery, treatment, or disposal that are not part of the reporting facility.

In this section, data are collected from Section 6 of Form R. For 2003, 64.9 million pounds of TRI chemicals were reported as sent off-site for further management or disposal.

Figure 6. All Off-Site Transfers of TRI Chemicals for Reporting Year 2003

(from Section 6 of Form R. The number inside the parentheses is the quantity of transfers in each category in millions of pounds and the percent figure is the percent of total transfers.)

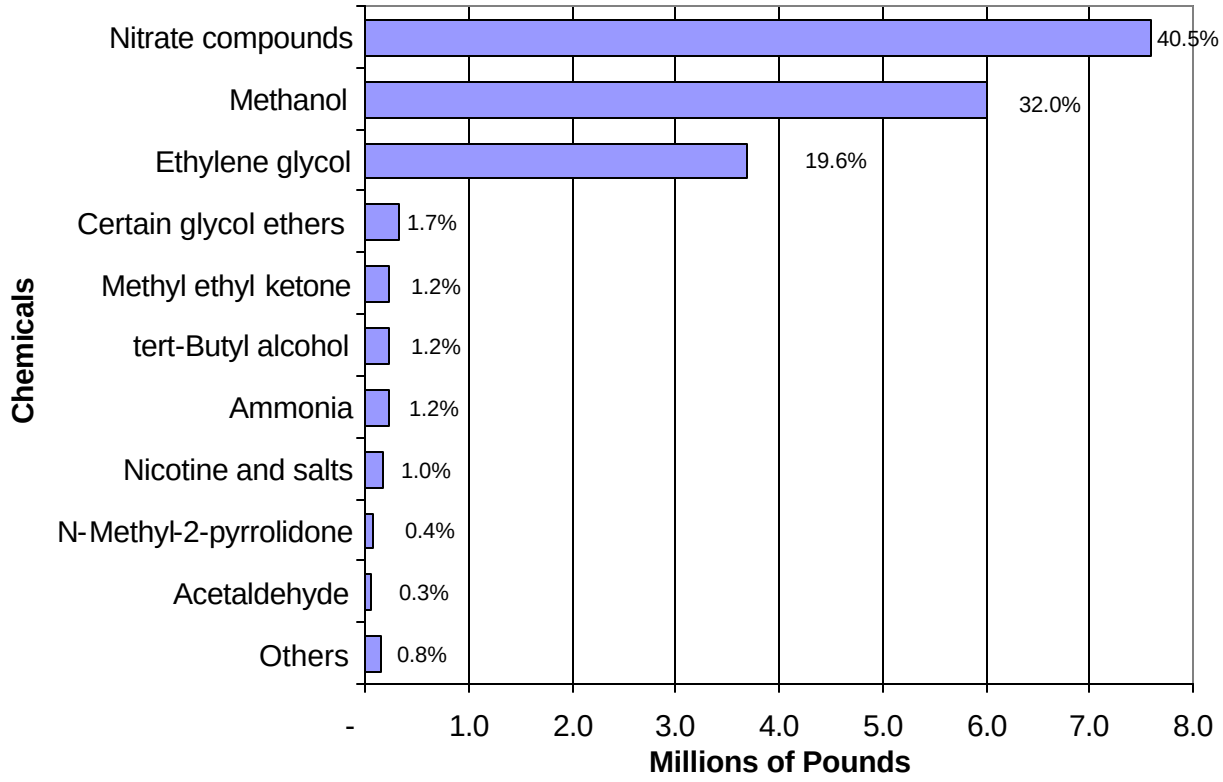


Transfers to Publicly Owned Treatment Works (POTWs)

A POTW is a wastewater treatment facility that is owned by a state or local government. Wastewater from facilities reporting under TRI is transferred through pipes or sewers to the POTW. The TRI information summarized below simply reports transfers of a chemical to a POTW. However, this is not necessarily the same as the release of a chemical to the environment. TRI chemicals may be treated, destroyed, and/or removed from the environment in a POTW's physical, chemical, and biological treatment processes. Some TRI chemicals are almost completely destroyed by a POTW. However, not all chemicals can be treated or removed by a POTW. Some chemicals such as metals and metal compounds may be removed, but are not destroyed. These may ultimately be disposed of in a permitted landfill or permitted land application process, with any remaining levels not removed being released through a permitted discharge to receiving waters.

Ten TRI chemicals accounted for approximately 99% or 18.6 million pounds of the total 18.8 million pounds of TRI chemicals transferred to POTWs in reporting year 2003. Nitrate compounds are a common byproduct of industrial wastewater treatment processes and have been the leading pollutant discharged to POTWs for treatment. The remaining top ten TRI chemicals transferred to POTWs in 2003 were: methanol, ethylene glycol, glycol ethers, methyl ethyl ketone, tert-butyl alcohol, ammonia, nicotine and salts, n-methyl-2-pyrrolidone, and acetaldehyde.

Figure 7. Top Ten TRI Chemicals Transferred to Publicly Owned Treatment Works (POTWs) in 2003 (from Section 6.1 of the Form R. The number next to each bar is the % of total transfers to POTW)

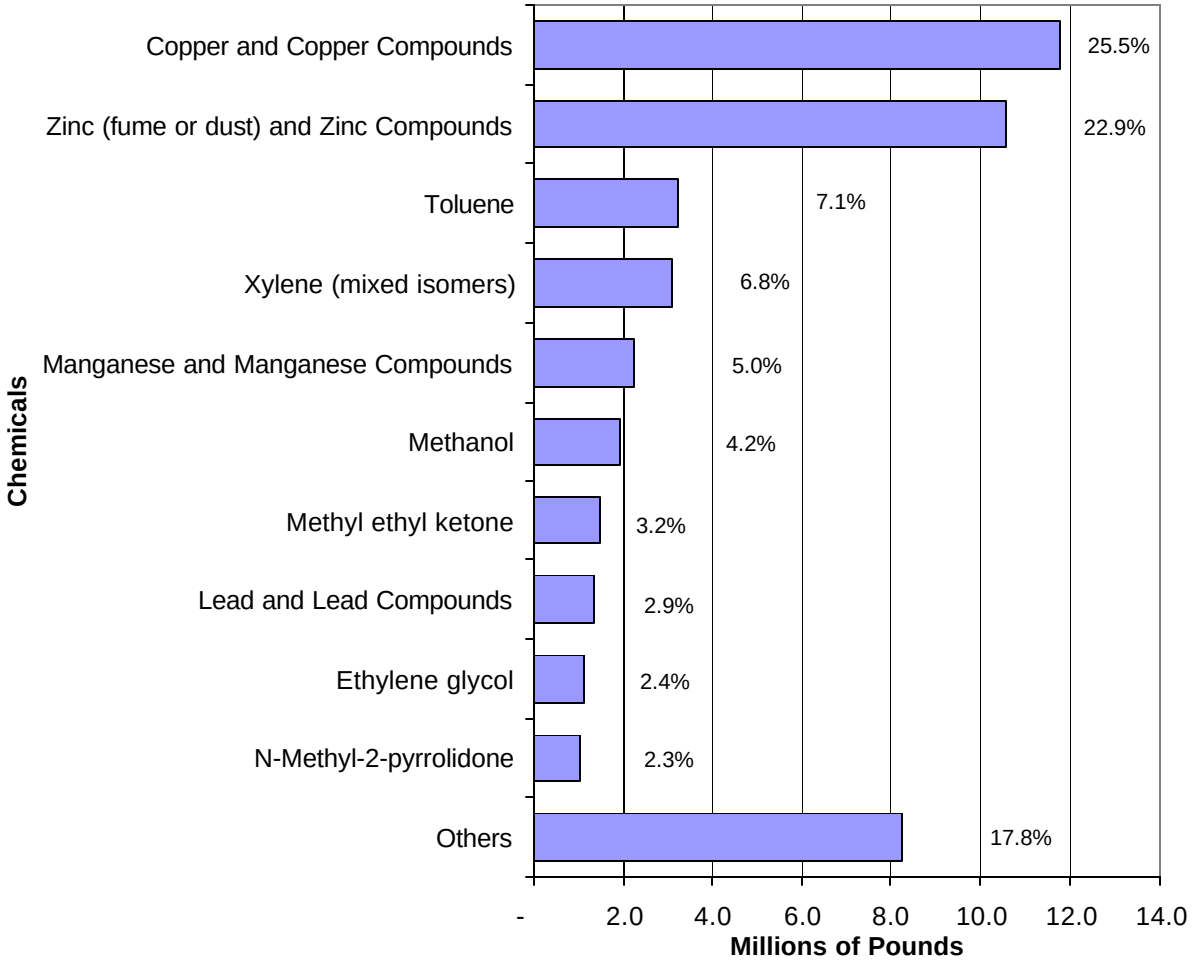


Transfers to Other Off-Site Locations

Section 6 of the Form R also sets out the transfer of TRI chemicals to facilities other than POTWs. These other off-site locations include incinerators, landfills, and other recycling, energy recovery, treatment, and/or disposal facilities. Off-site transfers can be to facilities located inside or outside of the Commonwealth.

In 2003, the total amount of TRI chemicals transferred to other off-site locations was approximately 46.1 million pounds. Ten TRI chemicals represented approximately 82.2% of the total TRI chemicals transferred off-site to locations other than POTWs. The top ten TRI chemicals and chemical categories transferred off-site to locations other than POTWs in 2003 were: copper and copper compounds, zinc and zinc compounds, toluene, xylene (mixed isomers), manganese and manganese compounds, methanol, methyl ethyl ketone, lead and lead compounds, ethylene glycol, and n-methyl-2-pyrrolidone.

Figure 8. Top Ten TRI Chemicals Transferred to Off-Site Locations Other than POTWs in 2003
(from Section 6.2 of the Form R. The number next to each bar is the % of total transfers to other off-site locations)



Part Four - On-Site and Off-Site Management

Under the Pollution Prevention Act of 1990, facilities subject to SARA Section 313 must report their source reduction and recycling activities. EPA added Section 8 to the Form R to track these production-related activities. Section 8 contains 11 subsections and requires facilities to extract and re-aggregate data reported in Sections 5 through 7 into releases (on- and off-site releases to the environment); off-site transfers/management; and on-site management categories. Unlike Part One of this chapter, Part Four discusses Section 8 data in its entirety, so that the methods of management can be compared, and so that pollution prevention and source reduction can be examined more closely.

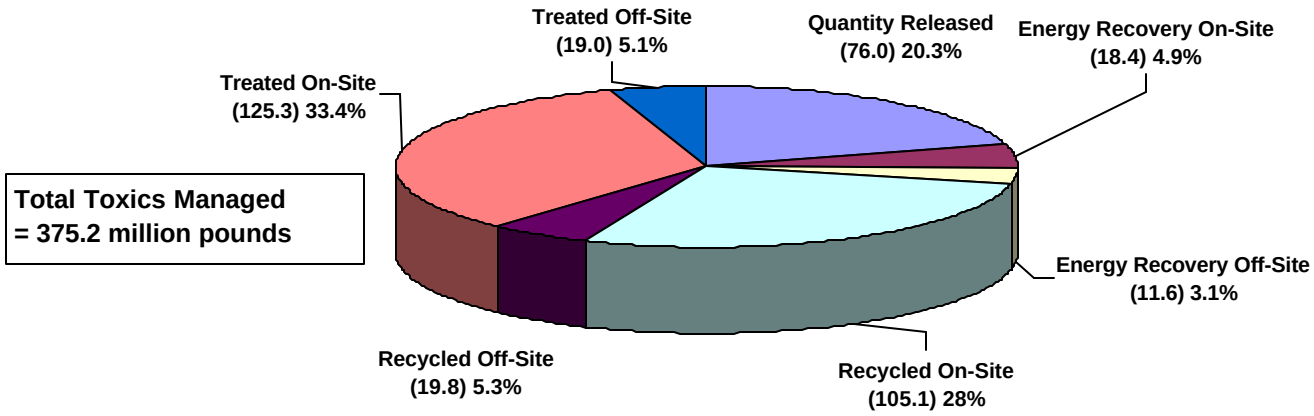
Some of the data and information reported in Sections 5, 6, and 7 are handled differently for Section 8 reporting.[13] Therefore, the total toxics managed and relative percentages, as reported in Section 8 and this part of Chapter One, do not precisely match those in Part One and Table 1.

Consistent with the pollution prevention goal, Section 8 and its subsections also report additional information that addresses resource reduction efforts. In general, facilities utilize several options to manage TRI chemicals. Treatment of waste, both on- and off-site, involves a variety of methods, including biological treatment, neutralization, incineration, and physical separation. Another option is on- or off-site recycling. This involves the toxic chemicals in wastes being recovered or regenerated and being returned for further processing or being made available for use in commerce. Energy recovery involves the combustion of toxic chemicals in industrial furnaces or boilers that generate energy for on- or off-site use. The least preferable and last management option is disposal, which is considered a release to the environment.

As reported in Section 8 of the 2003 facility reports, more than 375 million pounds of production-related TRI chemicals were released, treated, recycled, or recovered, both on- and off-site, from Virginia facilities (Figure 9). Approximately 66.2% of the TRI chemicals were managed on-site and 13.5% were transferred off-site to be managed by various means. As reported in Section 8 data, 20.3% of the reported TRI chemicals were released into the environment on-site.

[13] The differences are that the releases-to-the-environment data in Section 8 exclude catastrophic releases and a one-time events not associated with the production process. Furthermore, metal and metal compounds reported as transfers for off-site management in Section 6 are aggregated with the on-site release data from Section 5 as releases to the environment. Metal and metal compounds cannot be destroyed through treatment; hence, their final disposition is considered a release to the environment. There are other differences in how quantities are reported. Also, while Section 7 contains qualitative information about on-site management practices, subsections of Section 8 ask for quantitative data about facilities' on-site activities.

Figure 9. 2003 Management of TRI Chemicals (from Section 8 of Form R). The number inside the parentheses is the quantity of TRI chemicals handled by each management option in millions of pounds and the percent value is the percent of the option to the total TRI chemicals managed by all options.



Chapter Two - 2003 TRI Data for PBT Chemicals

This chapter addresses persistent bioaccumulative toxic (PBT) chemicals. PBT chemicals are those that remain in the environment for long periods of time, are not readily destroyed, and build up or accumulate in body tissue. Because of these attributes, beginning with reporting year 2000, EPA added several PBT chemicals to the TRI reporting list, and it lowered the reporting thresholds for 18 PBT chemicals and chemical categories. Beginning with reporting year 2001, lead and lead compounds were added to the PBT list, and their thresholds lowered to 100 pounds per year. Previously, lead and lead compounds had been treated as non-PBT chemicals.

For reporting year 2003, the Department received 388 reports and revisions for PBT chemicals, out of a total of 1919 TRI reports and revisions (20.2%). Table 2 shows the reporting thresholds for the TRI PBT chemicals. The table also shows that only eight of the 20 PBT chemicals were reported as released, transferred, or managed by facilities in Virginia for reporting year 2003. Appendix I has facility-specific information for PBT chemicals. Appendix J has general health and environmental information about the eight PBT chemicals reported for the 2003 Virginia TRI Report.

Table 2. TRI Reporting Year 2003 Persistent Bioaccumulative Toxic (PBT) Chemicals - Reporting Thresholds and Number of Reports Received

CAS Number	Chemical /Chemical Category Name	Reporting threshold	Reports received
309-00-2	Aldrin	100 lbs.	0
191-24-2	Benzo(g,h,i)perylene	10 lbs.	39
57-74-9	Chlordane	10 lbs.	0
N150	Dioxin and Dioxin-Like Compounds	0.1 gram	39
76-44-8	Heptachlor	10 lbs.	0
118-74-1	Hexachlorobenzene	10 lbs.	0
465-73-6	Isodrin	10 lbs.	0
7439-92-1	Lead	100 lbs.	103
N420	Lead Compounds	100 lbs.	105
7439-97-6	Mercury	10 lbs.	13
N458	Mercury Compounds	10 lbs.	34
72-43-5	Methoxychlor	100 lbs.	0
29082-74-4	Octochlorostyrene	10 lbs.	0
40487-42-1	Pendimethalin	100 lbs.	0
608-93-5	Pentachlorobenzene	10 lbs.	0
1336-36-3	Polychlorinated biphenyls (PCBs)	10 lbs.	1
N590	Polycyclic aromatic compounds (PACs)	100 lbs.	54
79-94-7	Tetrabromobisphenol A (TBBPA)	100 lbs.	0
8001-35-2	Toxaphene	10 lbs.	0
1582-09-8	Trifluralin	100 lbs.	0

Table 3 provides an overview and summary of 2003 PBT data. The data is organized similar to Table 1, Chapter One. In order to avoid duplicate counting, data extracted and re-aggregated in Section 8 from Sections 5 and 6 of Form R have not been included as "On-Site Management" in Table 3.

Table 3. Summary of Data by Type of Release, Transfer, and On-Site Management for PBT Chemicals (Dioxin and dioxin-like compounds are listed separately from the "Other PBT Chemicals" column because they were reported in grams, while the other PBT chemicals were reported in pounds. A conversion to pounds is shown in parentheses, using 1 pound = 453.59237 g.

ON-SITE RELEASES BY MEDIA (Section 5 of Form R)	Dioxin and dioxin-like compounds* (amounts for the year)	Other PBT chemicals (amounts for the year)
Total Air	189.28156 g (0.41730 lbs.)	43,431.08 lbs.
Fugitive Air	3.15922 g (0.00696 lbs.)	5,918.44 lbs.
Stack Air	186.12234 g (0.41033 lbs.)	37,512.63 lbs.
Water	2.2663 g (0.00499 lbs.)	1,892.46 lbs.
Land	1.42894 g (0.00315 lbs.)	342,439.38 lbs.
Total On-Site Releases to Media	**192.9768 g (0.42544 lbs.)**	**387,762.92 lbs.**
OFF-SITE TRANSFERS BY TYPE (Section 6 of Form R)		
Publicly Owned Treatment Works (POTWs) (includes metals and metal compounds)	0 g (0 lbs.)	887.11 lbs.
Total Other Off-Site Transfers	2.05339 g (0.00453 lbs.)	1,345,378.42 lbs.
Off-Site Transfers for Recycling	0 g (0 lbs.)	883,471.10 lbs.
Off-Site Transfers for Energy Recovery	0 g (0 lbs.)	2,928.39 lbs.
Off-Site Transfers for Other Treatment	0 g (0 lbs.)	10,156.58 lbs.
Off-Site Transfers for Disposal	2.05339 g (0.00453 lbs.)	448,822.35 lbs.
Total Off-Site Transfers	**2.05339 g (0.00453 lbs.)**	**1,346,265.53 lbs.**
ON-SITE MANAGEMENT (Subsections 8.2, 8.4, and 8.6 of Form R)		
Treated On-Site	0 g (0.00 lbs.)	46.4 lbs.
Recycled On-Site	0 g (0 lbs.)	35,107.99 lbs.
Energy Recovery On-Site	0 g (0 lbs.)	0 lbs.
Total On-Site Management	**0 g (0.00 lbs.)**	**35,154.40 lbs.**
Total PBT Chemicals Released On-site, Transferred Off-site, and Managed On-site by Reporting Facilities	**195.03019 g (0.42997 lbs.)**	**1,769,182.84 lbs.**

Facilities are allowed to report PBT chemicals up to 7 decimal places accuracy. For presentation purposes the summary amounts in this table have been rounded: however, the integrity of facility reported data has been maintained in the database. The specific data that was reported by each facility is located in Appendix I.

Comparing Table 3 (PBT chemical information) to Table 1 (information on all TRI chemicals), the amount of reported PBT chemicals released on-site (387,763 pounds) was 0.6% of the total TRI chemicals released on-site to the environment. A greater percentage of PBT chemicals were transferred off-site for treatment, recycling, energy recovery, or disposal (2.1%, or 1.3 million pounds). The reported PBT chemicals managed on-site (35,154 pounds) were just over one one-hundredth of one percent (0.014%) of the total TRI chemicals managed on-site. In reporting year 2002, the on-site releases of PBT contributed to 0.50% of the total releases, 4.9% of off-site transfers, and 0.008% of on-site management.

Information on the amounts of each individual chemical/chemical category released on-site, transferred off-site, and managed on-site for the seven PBT chemicals reported by Virginia facilities is provided in Table 4.

Table 4. Reporting Year 2003 Amounts of TRI PBT Chemicals released on-site, transferred off-site, and managed on-site, by PBT chemical (Dioxin and Dioxin-like compounds have been converted to pounds and included in the totals)

Chemical Name	Released On-site (in pounds) (from Section 5)	Transferred Off-site (in pounds) (from Section 6)	Managed On-site (in pounds) (from Section 8)
Benzo(g,h,i)perylene	28.95	59.72	4.00
Dioxin and Dioxin-Like Compounds	0.43	0.00	0.00
Lead	82,967.44	624,397.76	14,924.54
Lead Compounds	287,669.00	713,049.24	20,153.24
Mercury	271.11	51.72	0.00
Mercury Compounds	3,313.26	883.21	0.00
Polychlorinated Biphenyls (PCBs)	0.00	179.00	0.00
Polycyclic aromatic compounds (PACs)	13,513.16	7,644.88	72.62
Total for all 8 chemicals/categories	387,763.35	1,346,265.53	35,154.40

Of the PBT chemicals listed in Table 4, lead and lead compounds, polycyclic aromatic compounds (PACs), and mercury and mercury compounds contributed most to the management of PBT chemicals. Lead and lead compounds contributed to the bulk (95.6%) of the PBT chemical on-site releases. Referring back to Figures 5 and 8 in Chapter 1, lead and lead compounds ranked seventh in chemicals released on site to land in Virginia and eighth in chemicals transferred off-site other than to POTWs. Releases of lead and lead compounds and mercury and mercury compounds to the air (via stacks) or to the land (through fly ash disposal) can result from coal or oil combustion. PACs may form as a result of incomplete combustion of coal or oil or as a by-product of other industrial processes. PACs found in the waste stream can contain adequate heat value for energy recovery from incinerated waste.

Previous tables and figures have shown the management and environmental releases of those PBT chemicals reported to Virginia in 2003. Table 5 data show the distribution of PBT chemicals versus reported activities (manufacture, process, or otherwise use), as defined in the Glossary of Terms (Appendix B). A facility may report more than one type of activity for a TRI chemical.

Table 5. Activities and Uses of PBT chemicals at facilities for 2003 (from Section 3 of the Form R)

	Activities reported						
Chemical Name	**manufacturing only**	**processing only**	**otherwise use only**	**both manufacturing &processing**	**both manufacturing &otherwise use**	**both processing &otherwise use**	**manufacturing &processing &otherwise use**
Benzo(g,h,i)perylene	5	7	7	4	13	0	3
Dioxin and Dioxin-Like Compounds	35	0	2	1	0	0	1
Lead	4	58	14	5	5	8	9
Lead Compounds	19	36	5	14	9	5	17
Mercury	2	2	2	0	0	3	4
Mercury Compounds	14	1	1	4	5	1	8
Polychlorinated Biphenyls (PCBs)	0	0	1	0	0	0	0
Polycyclic aromatic compounds (PACs)	8	11	12	6	14	0	3
Total for all 8 chemicals/categories	87	115	44	34	46	17	45

Table 5 shows that “processing only” was the most frequently reported activity (115) involving PBT chemicals. Processing was followed by “manufacturing only” (87), and "manufacturing, processing, and otherwise use" (45). Main industrial sectors that reported processing of lead or lead compounds were the furniture and fixture industries; stone, clay, glass, and concrete products industries; primary metal and fabricated metal products industries; electronic or electrical equipment manufacturers; petroleum bulk plant operators; and manufacturer or transportation equipment. Dioxin and dioxin-like compounds are normally a product of incomplete combustion of waste stream containing chlorinated products. Lead or lead compounds can be co-manufactured under chemical manufacturing processes or as a by-product of fuel (coal or fuel oil) combustion. Industries such as primary metal; stone, clay, and glass products; transportation equipment manufacturers; electric power generation facilities; solvent recovery facilities; and paper and allied products industries were key reporters of lead compounds and mercury compounds in all three (manufacturing, processing, and otherwise used) activities.

CHAPTER THREE - INDUSTRIAL SECTORS, FACILITIES, AND JURISDICTIONS

In this chapter, the 2003 Virginia TRI Report presents information on industrial sectors, as identified by the primary standard industrial classification code (Part One), facilities (Part Two), and facility locations (Part Three). The Virginia Code requires the Virginia TRI Report to address these considerations. The chapter identifies the top ten Virginia industrial sectors, facilities, and facility locations (jurisdictions) based on the reported on-site releases and the total on-site management of TRI chemicals.[14]

Complete rankings of industrial sectors, facilities, and jurisdictions are included in Appendices K, L, and M.

Part One - Industrial Sectors

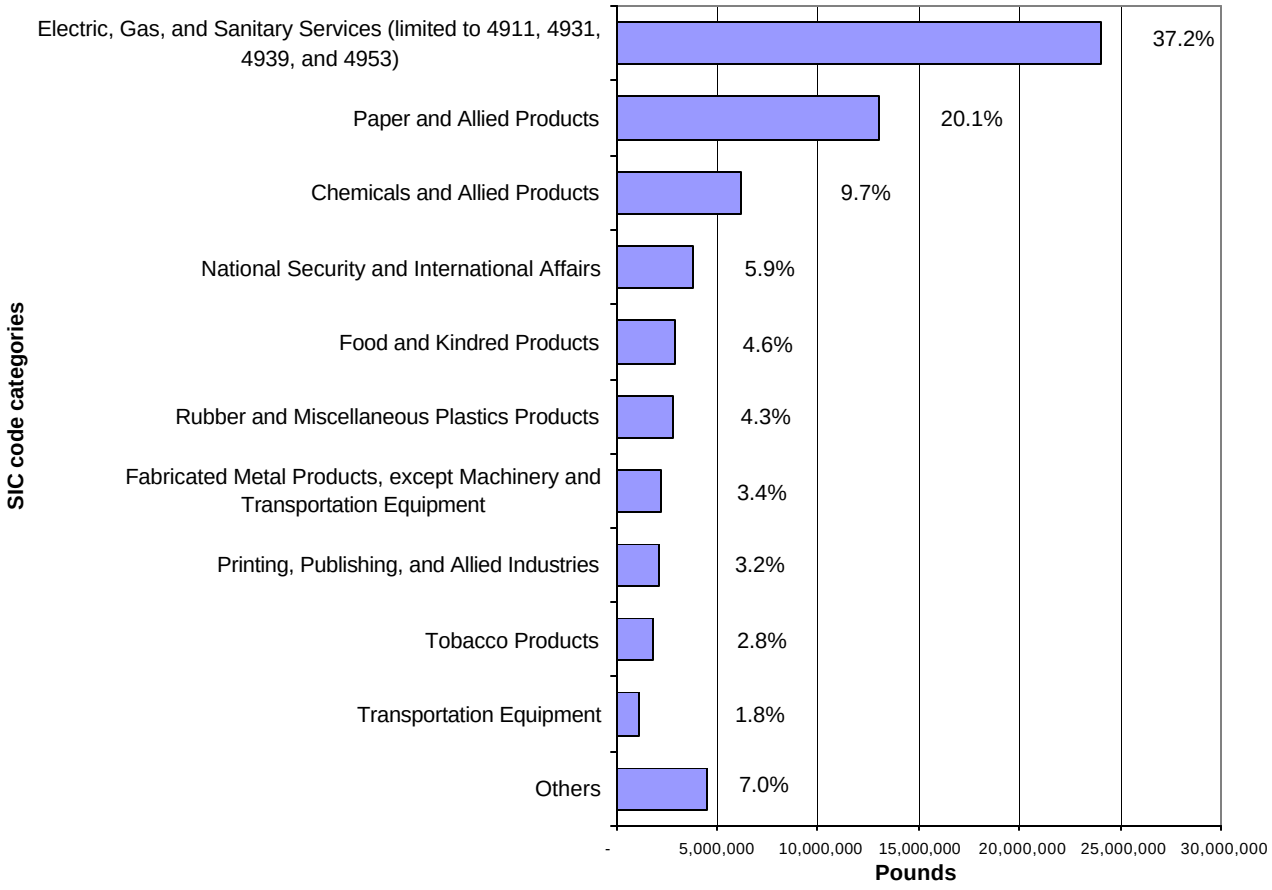
Industrial Sectors Reporting On-Site Releases of TRI Chemicals

Twenty-nine (29) industrial sectors, as well as federal facilities, are subject to TRI reporting requirements (see Appendix E).[15] The three industrial sectors reporting the most on-site releases of TRI chemicals for 2003, based on the primary Standard Industrial Classification (SIC) code, were: electric, gas, and sanitary services; paper and allied products; and chemicals and allied products. These three sectors contributed to 67% of the total on-site releases to the environment. The remaining top ten reporting industrial sectors for 2003 were: national security and international affairs, food and kindred products; rubber and miscellaneous plastics products; fabricated metal products; printing, publishing, and allied industries; tobacco products; and transportation equipment. A complete ranking of industrial sectors reporting on-site TRI releases is in Appendix K-1.

[14] As with Table 1 (Chapter 1) and Table 3 (Chapter 2), in order to avoid double counting, the data in this chapter for on-site releases comes from Section 5 of the Form R reports, and the data for on-site management comes from subsections 8.2, 8.4, and 8.6 of Form R.

[15] The Department is aware that EPA has proposed to substitute the North American Industry Classification System (NAICS) for Standard Industrial Classification (SIC) codes (see 68 Fed. Reg. 13872 (March 21, 2003)). This change is not yet final.

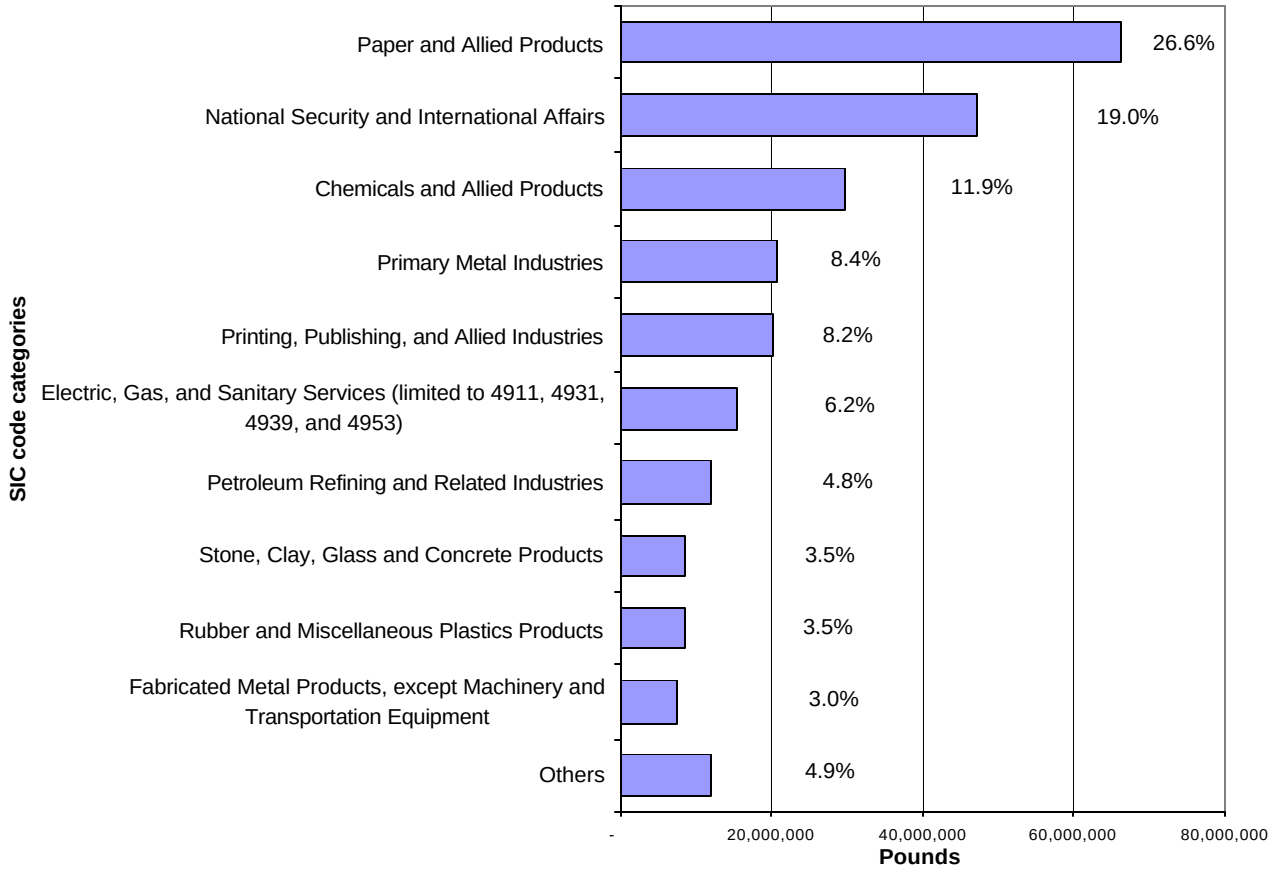
Figure 10. Top 10 Reporting Industrial Sectors (based on SIC codes) Releasing TRI Chemicals On-Site in Virginia for 2003 (from Section 5 of the Form R. The number next to each bar is the % of total on-site releases for all **2003** chemicals reported.)



Industrial Sectors Reporting On-Site Management of TRI Chemicals

The three industrial sectors reporting the most on-site management of TRI chemicals for 2003, based on the primary Standard Industrial Classification (SIC) code, were: paper and allied products; national security and international affairs; and chemicals and allied products. These three sectors contributed to 57.5% of the total of on-site management of TRI chemicals. The remaining top ten reporting industrial sectors for 2003 were: primary metal industries; printing, publishing and allied products; electric, gas, and sanitary services; petroleum refining and related industries; stone, clay, glass and concrete products; rubber and miscellaneous plastics products; and fabricated metal products. A complete ranking of industrial sectors reporting on-site TRI management is in Appendix K-2.

Figure 11. Top 10 Reporting Industrial Sectors (based on SIC codes) Managing TRI Chemicals On-Site in Virginia for 2003 (from Section 8 of the Form R. The number next to each bar is the % of total of on-site management for all **2003** chemicals reported. This figure does not include the data extracted and re-aggregated from Sections 5 and 6 of Form R.)



Part Two - Facilities

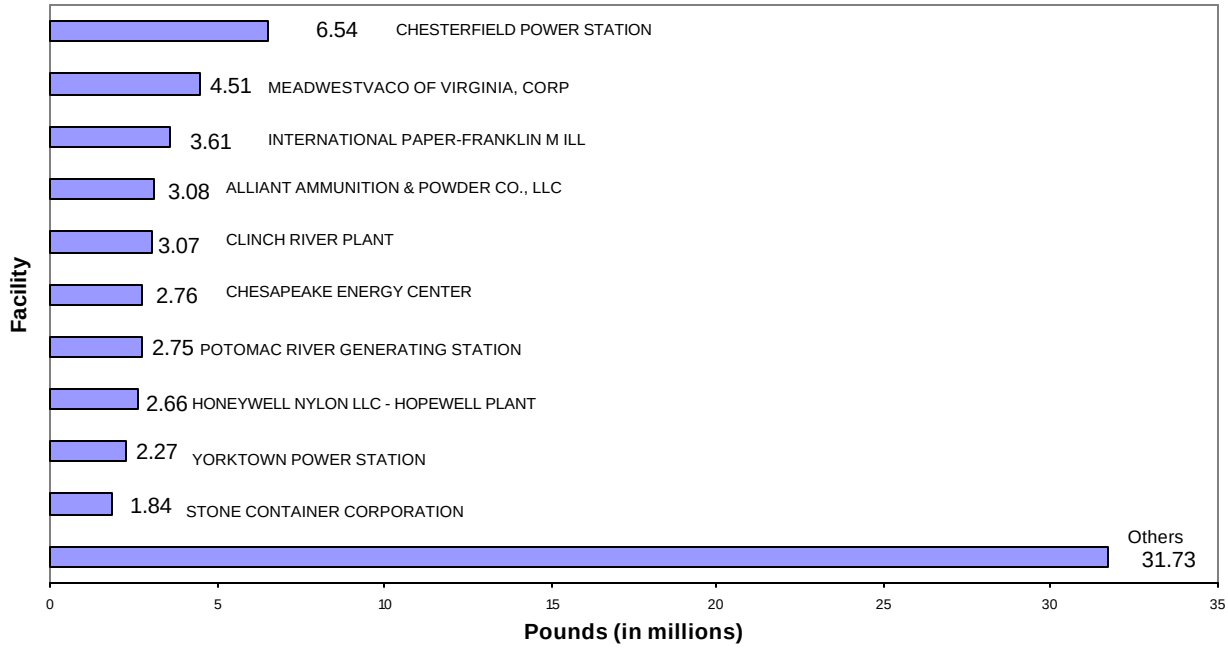
Facilities Reporting On-Site Releases of TRI Chemicals

Virginia facilities that reported the highest contributions to the on-site release of TRI chemicals to the air (fugitive and stack), water, and land in 2003 were:

- Chesterfield Power Station - 500 Coxendale Road, Chester, Chesterfield County
- MeadWestvaco of Virginia, Corp. - 104 E. Riverside St, Covington, Alleghany County
- International Paper - Franklin Mill - 34040 Union Camp Drive, Franklin, Isle of Wight County
- Alliant Ammunition & Powder Co., LLC - government owned, contractor operated (GOCO) - Route 114, Radford, Montgomery County
- Clinch River Plant - Junction of State Rte 664 & 665, Cleveland, Russell County
- Chesapeake Energy Center - 2701 Vepco Street, Chesapeake City
- Potomac River Generating Station - 1400 North Royal Street, Alexandria City
- Honeywell Nylon LLC. Hopewell Plant - Route 10 & Industrial Street, Hopewell City
- Yorktown Power Station. – 1600 Waterview Road, Yorktown, York County
- Stone Container Corporation – 19th and Main Streets, West Point, King William County

These facilities accounted for 51.1% (33.1 million pounds) of all reported TRI releases to these media for 2003. Of the ten facilities, five are power generation facilities, three are paper and allied products facilities, one is a federal facility, and one is chemical and allied products facilities. Figure 12 shows the quantity of TRI chemicals each of these facilities released in Virginia in 2003. See Appendix L-1 for a complete ranking of on-site releases by facility.

Figure 12. 2003 Top Ten Virginia Facilities Reporting Releases of TRI Chemicals On-Site (from Section 5 of the Form R. The number next to each bar is the total on-site releases (in millions of pounds) for each facility.)



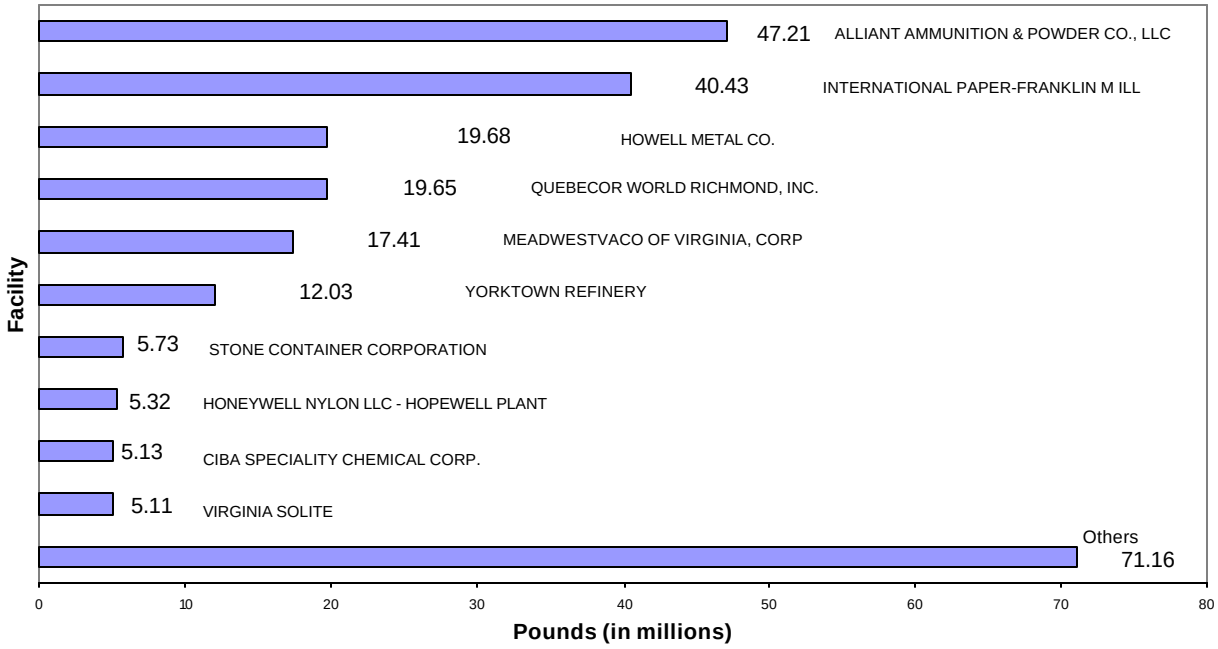
Facilities Reporting On-Site Management of TRI Chemicals

Figure 13 shows the ten Virginia facilities reporting management of the greatest quantity of TRI chemicals on-site in 2003, other than releases. These facilities were:

- Alliant Ammunition and Powder Plant - government owned, contractor operated (GOCO) - Route 114, Montgomery County
- International Paper - Franklin Mill - 34040 Union Camp Drive, Franklin, Isle of Wight County
- Howell Metal Co. - 574 Depot Rd., New Market, Shenandoah County
- Quebecor World Richmond, Inc. - 7400 Impala Dr., Henrico County
- MeadWestvaco of Virginia., Corp. - 104 E. Riverside St, Covington, Alleghany County
- Yorktown Refinery - 2201 Goodwin Neck Rd., Grafton, York County
- Stone Container Corporation – 19th and Main Streets, West Point, King William County
- Honeywell Nylon LLC – Hopewell Plant - Route 10 & Industrial Street, Hopewell City
- CIBA Specialty Chemical Corp – 2301 Wilroy Rd., Suffolk City
- Virginia Solite - 101 Solite Rd., Cascade, Pittsylvania County

These facilities accounted for 71.4% (177.7 million pounds) of all reported on-site management (other than releases) in 2003. Figure 13 shows the quantity of TRI chemicals each of these facilities managed on-site in Virginia in 2003. Of the ten facilities, three are paper and allied products facilities; two are chemical and allied products facilities; one is a printing, publishing, and allied industries facility; one is a federal facility; one is a stone, clay, glass, concrete facility; one is a primary metal industry; and one is a petroleum refinery. See Appendix L-2 for a ranking of on-site management by facility.

Figure 13: 2003 Top Ten Virginia Facilities Managing TRI Chemicals On-Site, Other than Releases (from Section 8 of the Form R. The number next to each bar is the total on-site management (in millions of pounds) for each facility. This figure does not include the data extracted and re-aggregated from Sections 5 and 6 of Form R.)



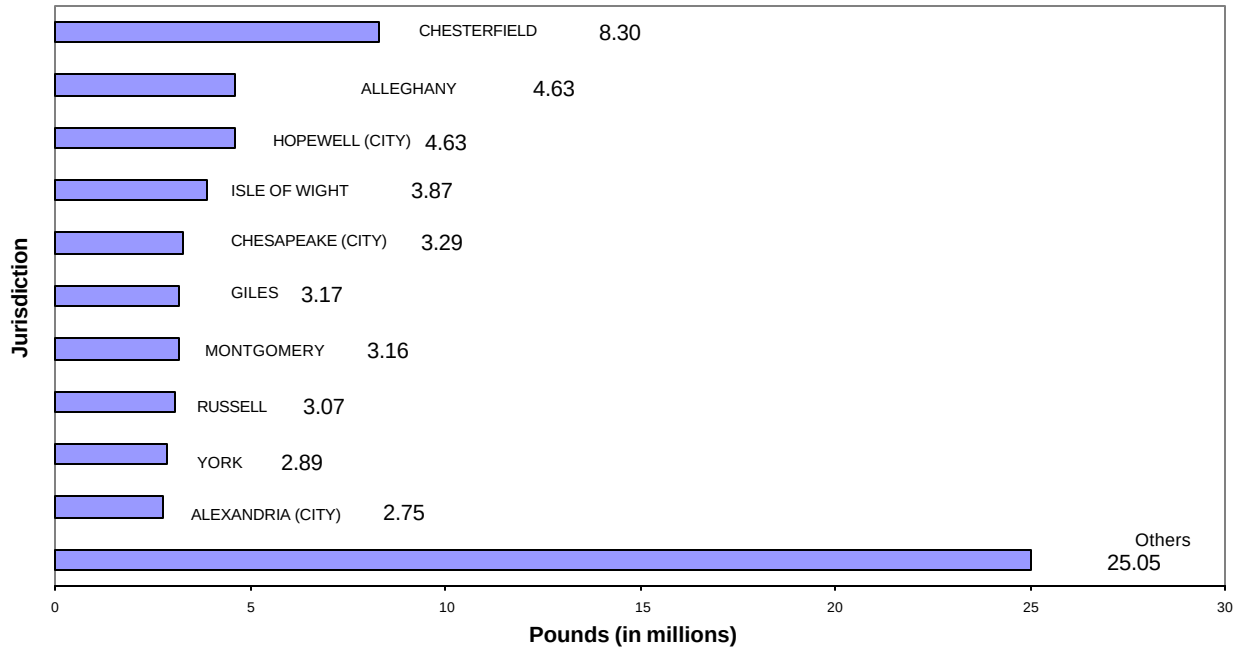
Part Three - Jurisdictions

Jurisdictions with Facilities Reporting On-Site Releases of TRI Chemicals

The Virginia jurisdictions (counties and independent cities) with facilities having the largest reported amount of total TRI chemicals released on-site to the environment (air, water, and land) in 2003 were as follows: Chesterfield County; Alleghany County; Hopewell City; Isle of Wight County; Chesapeake City; Giles County; Montgomery County; Russell County; York County, and Alexandria City. The reported on-site releases occurring within these jurisdictions comprised 61.4% (39.8 million pounds) of the total TRI chemicals released on-site into the Virginia environment by Virginia facilities.

Appendix M-1 of this document contains a ranking of jurisdictions by the on-site releases of facilities located there. Furthermore, Appendices H and I contain detailed information about facilities located in these jurisdictions.

Figure 14. 2003 Top Ten Virginia Jurisdictions with the Largest Amount of On-Site TRI Releases Reported by Facilities: from Section 5 of the Form R. The number next to each bar is the total on-site releases (in millions of pounds) for each jurisdiction.

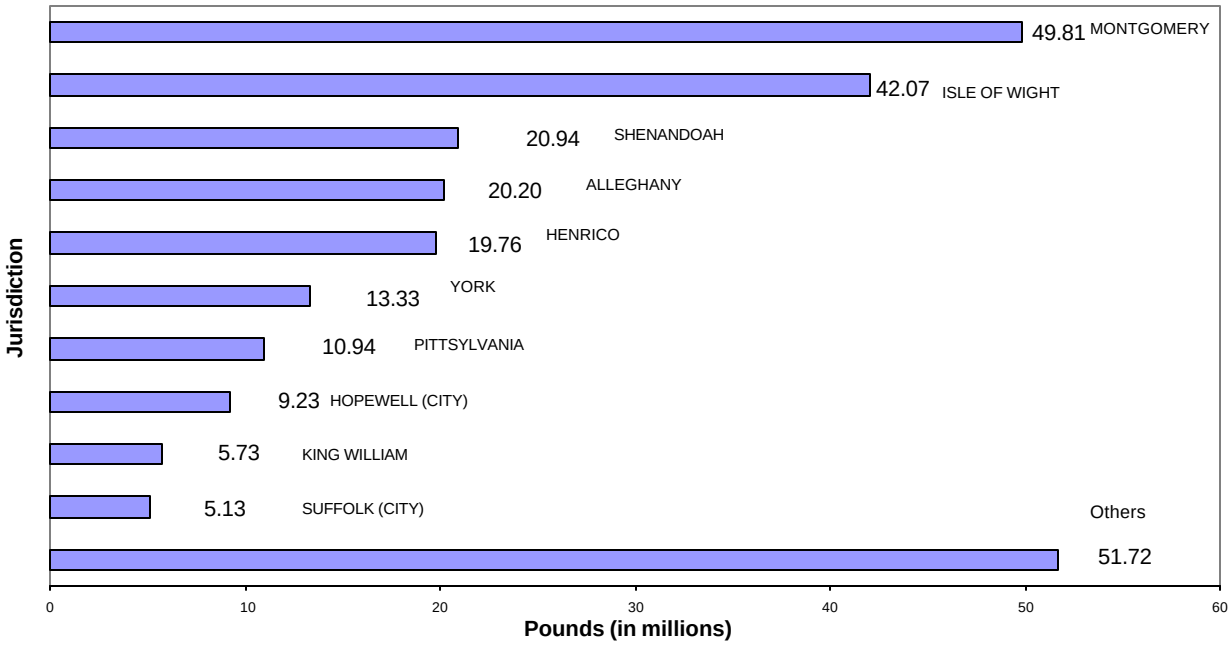


Jurisdictions with Facilities Reporting Other On-site Management of TRI Chemicals

The Virginia jurisdictions with facilities having the largest amount of total reportable TRI chemicals managed on-site (other than releases) were: Montgomery County, Isle of Wight County, Shenandoah County, Allegheny County, Henrico County, York County, Pittsylvania County; Hopewell City, King William County, and Suffolk City. The on-site management of these chemicals in these jurisdictions comprised 79.2% (197.1 million pounds) of total TRI chemicals managed on-site (other than releases) by reporting facilities in Virginia.

Appendix M-2 of this document contains a ranking of jurisdictions by the on-site management of facilities located there. Furthermore, Appendices H and I contain detailed information about facilities located in these jurisdictions.

Figure 15. 2003 Top Ten Virginia Jurisdictions with the Largest Amount of TRI Chemicals Managed On-Site as Reported by Facilities: (from Section 8 of the Form R. The number next to each bar is the total on-site management (in millions of pounds) for each jurisdiction. This figure does not include the data extracted and re-aggregated from Sections 5 and 6 of Form R.)



CHAPTER FOUR - VIRGINIA TRI HISTORICAL COMPARISON

Since its inception, the TRI program has been expanding and evolving, to provide more information to the public about the presence and release of toxic and hazardous chemicals in communities. Over the past 15 years, various regulatory changes have occurred (see Appendix D). In addition, facilities are authorized to revise reports from previous years. This makes direct comparison of current data to historical reports difficult and potentially misleading. Appendix G provides further information about the changes in reporting requirements, and sets out limited historical data that have been standardized.[16]

Nevertheless, reporting years 2000, 2001, 2002, and 2003 are generally comparable, and Chapter Four presents data for those four years. All revisions for those reporting years received on or before December 15, 2004 have been incorporated into this chapter. It should be noted, however, that beginning with reporting year 2001, lead and lead compounds were re-designated as PBT chemicals, and the threshold for reporting was reduced to 100 pounds. This caused facilities to submit significantly more reports for lead and lead compounds for reporting years 2001 through 2003.

Table 6 compares the TRI data for reporting years 2000 to 2003 by type of release, transfer, and on-site management.

For reporting year 2003, the total amount for each of the subcategories (on-site releases, off-site transfers, and on-site management) shows a decrease from the corresponding amount for reporting year 2002. From 2002 to 2003, the total of TRI chemicals released on-site, transferred off-site, or managed on-site decreased by 6.5%.

The most noticeable changes seen for the on-site releases in this table are the 10.3% decrease in on-site air discharge from 2002 to 2003 (including an 17.9% decrease in fugitive air emissions); a decrease in land disposal (6.1%); and a decrease in the overall on-site releases to the environment (8.9%).

Table 6 also shows that the transfers of TRI chemicals to off-site facilities for further management or disposal also decreased in 2003. Most notable for the 2003 reporting were the significant decreases in the usage of off-site facilities for recycling (20.4%) and increases of other off-site transfer options (including a 34.1% increase in off-site transfer for other treatment), as compared to 2002 data. The overall quantities of TRI chemicals transferred off site decreased by 3.6% for 2003.

The overall quantities of TRI chemicals managed on-site, through treatment, recycling, or energy recovery, decreased by 6.6%, including a substantial (61.1%) decrease in on-site energy recovery

Longer term trends can be seen in the last column of Table 6. Over the four years, on-site releases of TRI chemicals decreased 11.1%, off-site transfers increased 1.0%, and on-site management decreased 4.1%. Over the four years 2000 through 2003, Virginia facilities reported a 4.6% decrease in the release, transfer, or other management of TRI chemicals.

[16] The information in Appendix G is historical and is for general comparison only. Unlike Chapter Four, Appendix G does not include revisions received between January 14, 2004 and December 14, 2004.

Table 6. Comparison Summary Data by Type of Release, Transfer, and On-Site Management for TRI chemicals for 2000, 2001, 2002, and 2003 (from Table 1) [17]

MANAGEMENT ACTIVITIES	YR 2000 (POUNDS)	YR 2001 (POUNDS)	YR 2002 (POUNDS)	YR 2003 (POUNDS)	CHANGES 2002 - 2003	% CHANGE 2002 – 2003	% CHANGE 2000 - 2003
On-Site Releases							
Air (Total)	58,737,127	57,041,100	56,825,219	50,962,772	-5,862,446	-10.32%	-13.24%
Fugitive Air	6,738,384	7,619,219	6,380,319	5,239,126	-1,141,193	-17.89%	-22.25%
Stack Air	51,998,743	49,421,881	50,444,899	45,723,646	-4,721,253	-9.36%	-12.07%
Water	8,190,508	7,003,688	8,263,291	8,199,535	-63,756	-0.77%	0.11%
Land	6,007,532	6,487,320	6,020,363	5,651,581	-368,782	-6.13%	-5.93%
Underground Injection Wells	0	5	0	0	0		
Total	**72,935,167**	**70,532,109**	**71,108,872**	**64,813,888**	**-6,294,984**	**-8.85%**	**-11.13%**
Off-Site Transfers							
POTW	16,813,569	17,881,568	17,438,242	18,771,839	1,333,597	7.65%	11.65%
Other Off-Site Transfers (Total)	47,414,894	50,662,263	49,891,262	46,114,495	-3,776,767	-7.57%	-2.74%
Recycling	27,562,636	28,282,259	27,711,988	22,063,770	-5,648,218	-20.38%	-19.95%
Energy Recovery	9,352,550	8,680,816	11,582,983	11,792,758	209,775	1.81%	26.09%
Other Treatment	1,509,576	2,850,674	2,031,026	2,723,642	692,616	34.10%	80.42%
Disposal	8,990,133	10,848,513	8,565,265	9,534,325	969,060	11.31%	6.05%
Total	**64,228,463**	**68,543,831**	**67,329,505**	**64,886,334**	**-2,443,171**	**-3.63%**	**1.02%**
On-Site Management							
Treated On-Site	94,026,121	141,286,568	118,702,326	125,280,332	6,578,006	5.54%	33.24%
Recycled On-Site	122,010,789	94,875,493	100,513,775	105,170,428	4,656,653	4.63%	-13.80%
Energy Recovery On-Site	43,585,093	27,830,485	47,268,802	18,410,731	-28,858,071	-61.05%	-57.76%
Total	**259,622,002**	**263,992,546**	**266,484,903**	**248,861,491**	**-17,623,412**	**-6.61%**	**-4.14%**
Grand Total	**396,785,632**	**403,068,486**	**404,923,280**	**378,561,713**	**-26,361,568**	**-6.51%**	**-4.59%**

[17] Again, because facilities are authorized to revise reports from previous years, the 2003 Virginia TRI Report shows numbers for 2000 to 2002 that may be different from those in previous reports.

Table 7 compares, in detail, the TRI data for PBT chemicals by type of release, transfer, and on-site management for reporting years 2000 to 2003. From 2002 to 2003, the total of PBT chemicals released on-site, transferred off-site, or managed on-site decreased by 11.8%.

The most noticeable changes seen from 2002 to 2003 in this table are a 20.9% increase in on-site water releases, a 7.7% increase in land disposal, a 4.0% decrease in air emissions, and a 6.3% increase in overall on-site releases to the environment.

Table 7 also shows that the transfers of PBT chemicals to off-site facilities for further management or disposal decreased in 2003. More noticeably for the 2003 reporting were the significant decreases in the usage of off-site facilities for recycling (24.4%). Increases and decreases of other transfer options, as compared to 2002 data were much less as absolute amounts, although some had large percentage changes. The overall quantities of PBT chemicals transferred off site decreased by 16.8% for 2003. The overall quantities of PBT chemicals managed on-site, through treatment, recycling, or energy recovery, increased by 57.0% from 2002 to 2003.

Longer term trends can be seen in the last column of Table 7, although the changes in reporting requirements for lead and lead compounds beginning in 2001 significantly affects the comparison. Over the four years, on-site releases of PBT chemicals increased 136.3%, off-site transfers decreased 13.1%, and on-site management decreased 48.2%. Over the four years 2000 through 2003, Virginia facilities reported a 0.7% decrease in the release, transfer, or other management of PBT chemicals, despite the changes in lead reporting.

Table 7. Comparison Summary Data by Type of Release, Transfer, and On-Site Management for PBT chemicals for 2000, 2001, 2002, and 2003 (from Table 3) [18]

MANAGEMENT ACTIVITIES	YR 2000 (POUNDS)	YR 2001 (POUNDS)	YR 2002 (POUNDS)	YR 2003 (POUNDS)	CHANGES 2002 - 2003	% CHANGE 2002 – 2003	% CHANGE 2000 - 2003
On-Site Releases							
Air (Total)	24,048	46,085	45,247	43,431	-1,815	-4.01%	80.60%
Fugitive Air	2,837	8,208	6,748	5,918	-830	-12.29%	108.65%
Stack Air	21,212	37,878	38,499	37,513	-986	-2.56%	76.85%
Water	2,304	5,815	1,565	1,892	328	20.93%	-17.86%
Land	137,737	371,052	317,946	342,439	24,493	7.70%	148.62%
Underground Injection Wells	0	0	0	0			
Total	**164,089**	**422,952**	**364,758**	**387,763**	**23,005**	**6.31%**	**136.31%**
Off-Site Transfers							
POTW	607	1,323	1,036	887	-149	-14.38%	46.11%
Other Off-Site Transfers (Total)	1,548,895	2,670,324	1,617,130	1,345,378	-271,752	-16.80%	-13.14%
Recycling	1,120,821	963,474	1,168,578	883,471	-285,107	-24.40%	-21.18%
Energy Recovery	3	214	231	2,928	2,698	1169.96%	112530.38%
Other Treatment	4,024	6,528	13,137	10,157	-2,980	-22.69%	152.40%
Disposal	424,048	1,700,108	435,184	448,822	13,638	3.13%	5.84%
Total	**1,549,503**	**2,671,648**	**1,618,166**	**1,346,266**	**-271,901**	**-16.80%**	**-13.12%**
On-Site Management							
Treated On-Site	40,230	25,859	115	46	-68	-59.58%	-99.88%
Recycled On-Site	27,671	41,627	22,281	35,108	12,827	57.57%	26.88%
Energy Recovery On-Site	0	0	0	0	0	0.00%	0.00%
Total	**67,900**	**67,486**	**22,396**	**35,154**	**12,759**	**56.97%**	**-48.23%**
Grand Total	**1,781,492**	**3,162,086**	**2,005,320**	**1,769,183**	**-236,136**	**-11.78%**	**-0.69%**

[18] Again, because facilities are authorized to revise reports from previous years, the 2003 Virginia TRI Report shows numbers for 2000 to 2002 that may be different from those in previous reports. As described in the text, reporting requirements for lead and lead compounds changed beginning with reporting year 2001.

CHAPTER FIVE - CONCLUSION

The Virginia TRI Report is issued under mandate of state law. The report has information on chemicals and chemical categories, activities involving their use, industrial sectors, facilities, and facility locations (jurisdictions). It provides historical perspective on TRI chemicals in the Commonwealth.

The report provides the public with information concerning listed toxic chemicals and chemical categories that are manufactured, processed, or otherwise used at Virginia facilities, including amounts released to the environment, transferred off-site, and managed on-site. Industry can use the data in a variety of ways, including a measurement of its progress toward reduction targets.

There are limitations on the use of TRI data, especially with regard to assessment of risk and the comparison of data for various years.

Since 1988, the amount of TRI chemicals released or otherwise managed has historically decreased. That trend continued for calendar year 2003. Virginia facilities reported a 6.5% decrease in the release, transfer, or on-site management of TRI chemicals for calendar year 2003, including a decrease of 8.9% in on-site releases, when compared to similar data reported for 2002. Over the past four years (reporting years 2000-2003), the amount of TRI chemicals released, transferred off-site or managed on site has decreased by 4.6%.

For PBT chemicals, Virginia facilities reported an 11.8% decrease in the release, transfer, or on-site management of TRI chemicals for calendar year 2003, despite a 6.3% increase in on-site releases, when compared to similar data reported for 2002. Over the past four years (reporting years 2000-2003), the amount of TRI chemicals released, transferred off-site or managed on site has decreased by 0.7%, even though more stringent reporting requirements for lead and lead compounds took effect in 2001. At this time, it is not possible to predict with confidence whether these trends will continue.

All parts of the agency and other sectors of government, all Virginia businesses and industry, and all Virginia's citizens have a role in managing and controlling the release of toxic chemicals in the Commonwealth.